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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/561,821	02/07/2007	Sakae Koyata	P35790	2851

⁷⁵⁹⁰
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Reston, VA 20191

EXAMINER

OLSEN, ALLAN W

ART UNIT	PAPER NUMBER
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1792

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05/28/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/561,821	Applicant(s) KOYATA ET AL.	
	Examiner Allan Olsen	Art Unit 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 December 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 December 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 2-6 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The concentrations set forth in claims 2 and 6 are unclear.

Claims 2 and 5 recite:

“...when the acid aqueous water solution mainly composed of hydrofluoric acid and nitric acid is made 100 percent by weight, said acid aqueous water solution contains phosphoric acid 30 to 40 percent by weight”.

Claim 3 recites:

“...wherein said acid etching solution contains phosphoric acid equal to or more than 30 percent by weight in the acid aqueous water solution 100 percent by weight mainly composed of hydrofluoric acid and nitric acid”.

The examiner will only address claim 3 as the issues in claims 2 and 5 are similar to the issues presented by claim 3 and resolution of the claim 3 issues should also be applicable to the resolution of the issues in claims 2 and 5.

The amount of each acid component is unclear because the concentration of the acids used to make the mixture is not set forth. Phosphoric acid is an aqueous solution of H_3PO_4 . Does applicant intend for the etching solution to comprise equal to or greater than 30% by weight H_3PO_4 or 30% by weight phosphoric acid (i.e. an aqueous solution of H_3PO_4)? If the etching solution comprises 30% or more of phosphoric acid then the amount of H_3PO_4 would still not be known unless the concentration of the acid reagent or stock solution is specified. Similar concerns pertain to the hydrofluoric acid and the nitric acid as well.

Furthermore, claim 6 requires the acid etching process to be performed by a spin-coating method, in which the acid is dripped on the silicon wafer and the wafer is spun so that the dripped acid etching solution is spread over the whole surface of the wafer. However, this is contrary to the limitation of claim 3 upon which claim 6 is dependent because claim 3 requires the etching process to be an immersion etching process.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claim 1 is rejected under 35 U.S.C. 102(a) as being anticipated by Koyata et al. in WO2005/055302 (hereinafter, Koyata and citing to US 7,338,904 as the English language equivalent).

Koyata teaches a method of processing silicon wafers. Koyata teaches the wafers first undergo a lapping process and then a cleaning process. Koyata teaches immersing the wafer into an acid etching solution mainly composed of hydrofluoric acid and nitric acid and containing phosphoric acid (see, for example: figures 1 and 3; column 3, lines 57-62; column 11, line 61 – column 12, line 8).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 2-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koyata as applied to claim 1 above.

The above noted teaching of Koyata is herein relied upon. Additionally, it is noted that Koyata teaches storing acid etching solution and alkali etching solution in plural etching tanks and immersing the silicon wafer into the acid etching solution and then the alkali etching (see column 10, lines 39-58). Koyata teaches mirror-polishing the front surface of the etched wafer, and then cleaning the front surface mirror-polished wafer (see, for example: figure 1; column 17, lines 40-50). Koyata teaches a process in which an alkali etching is performed after an acid etching (see, for example: column 10, lines 48-49). Additionally, Koyata teaches including a rear surface slight-polishing process to polish a portion of the unevenness of the wafer rear surface formed by said etching process between the etching process and the front surface mirror-polishing process (see, for example: figure 1 and column 13, lines 3-8).

Koyata does not teach that the “acid etching solution contains phosphoric acid equal to or more than 30 percent by weight in the acid aqueous water solution 100 percent by weight mainly composed of hydrofluoric acid and nitric acid.”

It would have been obvious to one skilled in the art to use an etching composition within the claimed ranges because Koyata teaches the acid etching is mainly comprised of hydrofluoric acid and nitric acid. Koyata teaches that phosphoric acid may be added to the primary (i.e. HF/HNO₃) etchant. As such, it would have been obvious to one skilled in the art to optimize the H₃PO₄ concentration with the H₃PO₄ comprising a minor component.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allan Olsen whose telephone number is 571-272-1441. The examiner can normally be reached on M, W and F: 1-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Allan Olsen/
Primary Examiner, Art Unit 1792